

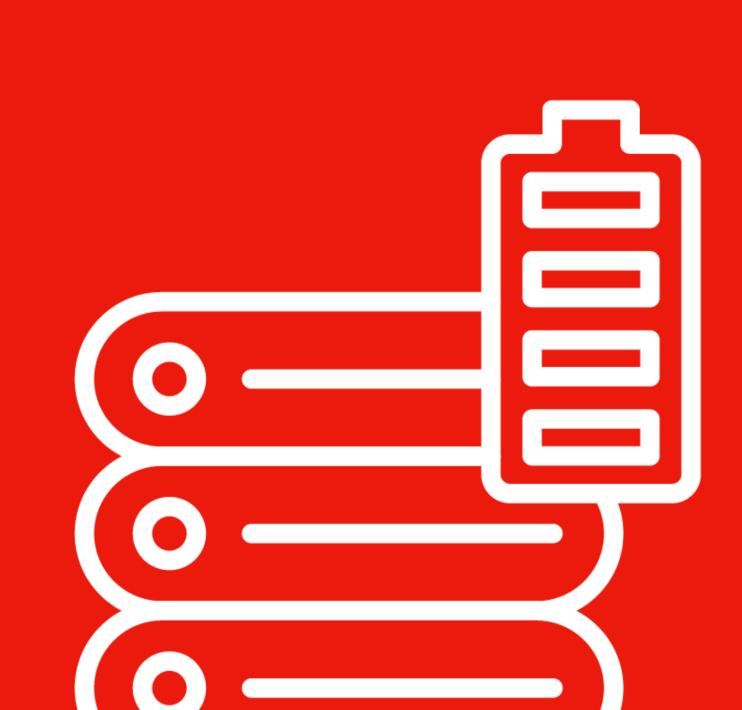
festly.

5 Key Sustainability Challenges & Solutions

The Environmental Impact of the Digital World

The digital world relies on physical infrastructure—data centres, networks, and servers—which consume vast amounts of energy and resources, and contribute to climate change.

1. Manage Data Center Energy Consumption



CHALLENGE

Global data centre energy consumption ¹ in 2022 was estimated to be 1-1.3% of total demand

In 2023, Ireland's data centres used more power than all urban homes²

By 2030, data centres a may emit 2.5B tons of GHG—rivaling aviation 4

SOLUTIONS

Increase renewable energy coverage

Improve IT equipment and overall data centre energy efficiency

Deploy heat recovery systems in data centres to make good use of waste heat

2. Manage Al's Growing Energy Demand



CHALLENGE

Al queries are estimated to use at least 5x more energy than standard web searches⁵

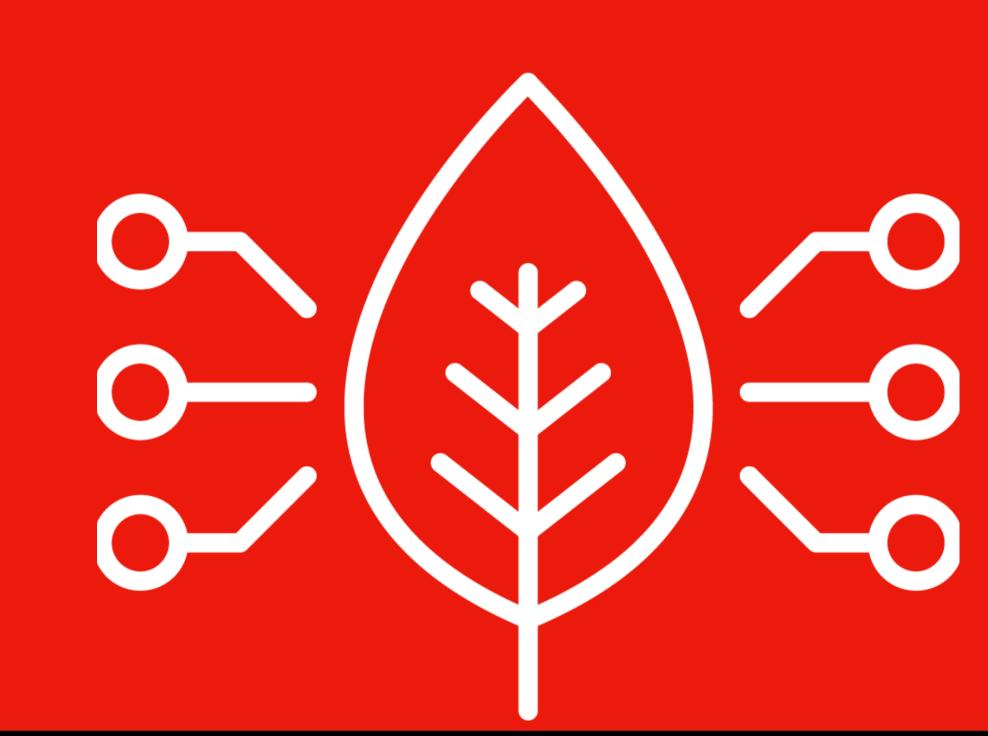
The Al industry could consume as much energy as a country the size of the Netherlands by 2027

SOLUTIONS

Use smaller, more efficient Al models to reduce energy consumption

Cache Al responses to minimize redundant computations

3. Eliminate Software Inefficiencies



CHALLENGE

Unoptimized software increases energy consumption

Bloated websites and apps overload servers with excessive code

SOLUTIONS

Move away from Proof of Work (PoW) systems - Ethereum cut energy use by 99.95% with Proof of Stake (PoS)⁷

Optimize web applications – Reduce excessive JavaScript & unnecessary single-page applications (SPAs)

Go edge/serverless - Process data closer to users

4. Optimise Digital Infrastructure



CHALLENGE

Redundant computations, poor data routing, and inefficient content delivery waste energy

SOLUTIONS

Implement real-time load balancing to distribute workloads dynamically

Adopt modular, energy-efficient computing that matches resources to demand

Optimize server use by consolidating workloads to reduce idle computing

5. Improve Hardware Circularity



CHALLENGE

62m tonnes of e-waste was produced in 2022, and it's forecast rise to 82m tonnes by 2030 8

Less than a quarter was recycled: we're wasting huge amounts of valuable resources

SOLUTIONS

Use more recycled materials in IT hardware

Refurbish and reuse to extend hardware lifespans

Develop modular components that allow for upgrades instead of replacements

Boost recycling to recover rare metals and reduce new mining

4 https://ourworldindata.org/ghg-emissions-by-sector

¹ https://www.iea.org/energy-system/buildings/data-centres-and-data-transmission-networks

² https://www.theguardian.com/world/article/2024/jul/23/ireland-datacentres-overtake-electricity-use-of-all-homes-combined-figures-show ³ https://www.reuters.com/markets/carbon/global-data-center-industry-emit-25-billion-tons-co2-through-2030-morgan-stanley-2024-09-03/

⁵ https://news.mit.edu/2025/explained-generative-ai-environmental-impact-0117

⁶ https://www.bbc.co.uk/news/technology-67053139 ⁷ https://ethereum.org/en/developers/docs/consensus-mechanisms/pos/pos-vs-pow/

⁸ https://ewastemonitor.info/the-global-e-waste-monitor-2024/